REMARKS

Reexamination and reconsideration of the application as amended are requested. Support for the added language in claims 1 and 16 is found in the specification, page 9, line 30 to page 10, line 4.

The Examiner's rejection of claims 1-6, 8-15 and 17-19 as being "obvious", under 35 U.S.C. 103, is respectfully traversed. The examiner rejects these claims as being unpatentable over Harbottle in view of Binder. Applicants believe the following minor changes are necessary to the examiner's description of Harbottle: the non-rotatable section is 2 (to which inner race 34 is attached) and the rotatable section is 4 (to which outer race 36 is attached) because the hub 4 (to which a road wheel 10 is attached) rotates about stationary spindle 2 (see the first sentence of the abstract); the inboard seal is 30; and the outboard seal is 32 (which is an end cap). The force sensor 52 measures the clamping force exerted by the nut 46 which represents the preload in the bearings 6 and 8 and which is useful in adjusting the bearings 6 and 8 to a desired condition of preload (see column 4, lines 14-24). The whole purpose of the invention of Harbottle is bearing adjustment using a compressive force sensor as suggested by the title of the patent. The examiner alleges that it would have been obvious to modify Harbottle according to the teachings of Binder (which uses a force sensor to input force data to a vehicle control system) for the purpose of inputting data from a sensor to a vehicle control system. There is no teaching, description or suggestion in Harbottle and/or Binder to add the force sensor of Binder to Harbottle or to replace the force sensor of Harbottle with the force sensor of Binder. Harbottle is not concerned with force sensors for vehicle control systems but is concerned only with force sensors to measure (and adjust as required) the clamping force (exerted by a nut) which represents a bearing preload. Whereas it would be proper to replace the bearing preload force sensor 52 of Harbottle with another bearing preload force sensor, it is not proper to replace a bearing preload force sensor (which can't be used for determining at least one component of a force applied to the rotatable section, as required by applicants' claims) with another force sensor which would not be used to determine the bearing preload since that would defeat the very purpose of the invention of Harbottle.

The general rule is that a section 103 rejection based upon a modification of a reference that destroys the intent, purpose or function of the invention disclosed in the reference is not proper and the prima facie case of obviousness cannot be properly made. In other words, where there is no technological motivation for engaging in the modification and instead a disincentive, the rejection is improper. In re Gordon, 733 F.2d 900, 902 (Fed. Cir. 1984). Also, where the suggested combination of references would require a substantial reconstruction and redesign of the elements shown in one of the references as well as a change in the basic principles under which the constuction of that reference was designed to operate, the combination is not a proper ground for rejection of the claims under section 103. In re Ratti, 270 F.2d 810, 813, 123 USPQ 349, 352 (CCPA 1959).

Claims 5 and 8-10 require at least one sensor 616 which senses the passage of the rolling elements 633 around the raceway and whose output is used for determining at least one component of a force applied to the rotatable section 614 (see the specification, page 11, lines 9-18), wherein the determined at-least-one component is an input to a vehicle control system. The force sensor 52 of Harbottle senses the clamping force of the nut 46 (see column 4, lines 14-24). The force sensor of Binder is a microsensor 6 having bending bars 8 which, when subject to an applied force, bend to contact switching stops 9 and close an electronic contact (see column 5, line 65 to column 6, line 7). Neither Harbottle nor Binder teach, suggest or describe a force sensor which senses the passage of the rolling elements and whose output is used for determining at least one component of a force applied to the rotatable section, wherein the determined at-least-one component is an input to a vehicle control system, as required by applicants' claims 5 and 8-10. It is noted that column 5, lines 46-67 of Harbottle were cited by the examiner but merely describe how the bearing is assembled.

Claims 6 and 12-14 require at least one sensor 116 which measures the distance between the non-rotatable and rotatable sections 112 and 114 and whose output is used for determining at least one component of a force applied to the rotatable section 114 (see the specification, page 7, lines 25-30), wherein the determined at-least-one component is an input to a vehicle control system. The force sensor 52 of Harbottle senses the clamping force of the nut 46 (see column 4, lines 14-24). The force sensor of Binder is a microsensor 6 having bending bars 8 which, when

subject to an applied force, bend to contact switching stops 9 and close an electronic contact (see column 5, line 65 to column 6, line 7). Neither Harbottle nor Binder teach, suggest or describe a force sensor which measures the distance between the non-rotatable and rotatable sections and whose output is used for determining at least one component of a force applied to the rotatable section, wherein the determined at-least-one component is an input to a vehicle control system, as required by applicants' claims 6 and 12-14. It is noted that columns 3 and 4, lines 20-27 and 33-55 of Harbottle were cited by the examiner but merely describe the arrangement of bearing parts without describing how the force sensor 52 of Harbottle works. Harbottle's force sensor 52 is a strain gage (see column 4, line 62 to 64) which (see figure 2) measures the clamping force of nut 46 (see column 4, lines 14-24) and does not and can not measure the distance between the races (see figure 2 for the placement of the nut, the sensor, and the races which clearly indicates that the sensor cannot measure the distance between the races).

Claims 17-19 require at least one sensor 516 which measures temperature and whose output is used for determining at least one component of a force applied to the rotatable section (see the specification, page 9, line 30 to page 10, line 4), wherein the determined at-least-one component is an input to a vehicle control system. The force sensor 52 of Harbottle senses the clamping force of the nut 46 (see column 4, lines 14-24). The force sensor of Binder is a microsensor 6 having bending bars 8 which, when subject to an applied force, bend to contact switching stops 9 and close an electronic contact (see column 5, line 65 to column 6, line7). Neither Harbottle nor Binder teach, suggest or describe a force sensor which measures temperature and whose output is used for determining at least one component of a force applied to the rotatable section, wherein the determined at-least-one component is an input to a vehicle control system, as required by applicants' claims 17-19.

Regarding claims 13, 14, 17 and 18, the examiner alleges that Harbottle discloses a non-rotatable race which includes a hub 4 with the sensor 52 attached to the hub. Applicants respectfully disagree. Sensor 52 of Harbottle is attached to stationary spindle 2 (see figure 1) about which hub 4 rotates, wherein the road wheel 10 is attached to the hub 4, and wherein for the wheel to rotate, the hub must rotate (see the first sentence of the abstract).

The Examiner's rejection of claims 7, 16, 20 and 21 as being "obvious", under 35 U.S.C. 103, is respectfully traversed. The examiner rejects these claims as being unpatentable over Harbottle in view of Binder and further in view of Joki '935. Claim 21 depends from claim 20 which no longer mentions temperature. Claims 7 and 16 now require at least one sensor 516 which measures temperature and whose output is used without any non-temperature sensor output for determining at least one component of a force applied to the rotatable section, wherein the determined at-least-one component is an input to a vehicle control system. The force sensor 52 of Harbottle senses the clamping force of the nut 46 (see column 4, lines 14-24). The force sensor of Binder is a microsensor 6 having bending bars 8 which, when subject to an applied force, bend to contact switching stops 9 and close an electronic contact (see column 5, line 65 to column 6, line7). Joki uses the output of a temperature sensor and the output of a resistor-type strain sensor (having a variable temperature resistance). There is no way to combine Harbottle, Binder and/or Joki to produce at least one sensor 516 which measures temperature and whose output is used without any non-temperature sensor output for determining at least one component of a force applied to the rotatable section, as required by claims 7 and 16.

Inasmuch as each of the rejections has been answered by the above remarks and amended claims, it is respectfully requested that the rejections be withdrawn, and that this application be passed to issue.

Respectfully submitted,

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